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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
YANG, NELSON C	
ART UNIT	PAPER NUMBER
1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/814,995	SPENCER ET AL.	
	Examiner	Art Unit	
	Nelson Yang	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *5,6,9 and 14* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7,8,10-13 and 15-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment of claims 1, 18, is acknowledged and has been entered.

2. Claims 1-4, 7-8, 10-13, 15-18 are currently pending and under examination.

3. Claims 5, 6, 9, 14, are withdrawn.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-4, 10, 12, 17, 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Morgenthaler et al. [Morgenthaler et al., Surfaces with a hydrophobicity gradient: possible applications in biological testing, 2001, European Cells and Materials, 6 (supplement 1): pp. 69].

With respect to claims 1, 3, 10, Morgenthaler et al. teach a method of creating surfaces with a hydrophobicity gradients comprising immersion of substrates in a thiol solution and preparing wettability gradients on the substrate using a linear motion drive to control the immersion, wherein the adsorption kinetics can be controlled by the concentration of the solution, the solvent, and the immersion time (p.69, col.1).

6. With respect to claim 2, 12, Morgenthaler et al. teach immersion of the substrate in methyl-terminated solutions and subsequent saturation in hydroyl-terminated solution.

7. With respect to claim 4, Morgenthaler et al. teach silicon wafers coated with gold (p.69, col.1).

8. With respect to claim 18, Morgenthaler et al. teach that the resulting surfaces can be used for biomolecular interactions, diagnostics, or cell-motility studies (p.69, col.1).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 7, 8, 16, are rejected under 35 U.S.C. 103(a) as being unpatentable over Morgenthaler et al. [Morgenthaler et al., Surfaces with a hydrophobicity gradient: possible applications in biological testing, 2001, European Cells and Materials, 6 (supplement 1): pp. 69] in view of Genzer et al. [US 6,770,323].

With respect to 7, 8, Morgenthaler et al. teach a method of creating surfaces with a hydrophobicity gradients comprising immersion of substrates in a thiol solution and preparing wettability gradients on the substrate using a linear motion drive to control the immersion, wherein the adsorption kinetics can be controlled by the concentration of the solution, the solvent, and the immersion time (p.69, col.1). Morgenthaler et al. further teach that by varying the concentration of solutions, the sequence of the immersion, and the immersion speed of the substrate, wettability gradients of different slopes can be generated (p. 69, col.1). Morgenthaler

et al. do not teach that the surface of the substrate is an oxide or hydrophobic polymer, and that the first and second solutions comprise polyelectrolyte solutions.

Genzer et al., however, teach that patterned substrates may be used as detection targets, and that one can produce a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, such that a complex biomolecules will choose an optimum combination of hydrophobic/cationic forces, and one can conveniently measure the adsorption properties of complex molecular species (column 14, lines 54-65). Genzer et al. further teach that these gradients may be created using a silicon oxide covered wafers (column 15, lines 34-40) or PDMS substrates, which are hydrophobic substrates (column 5, lines 10-20), and coating the substrates with polyelectrolyte solutions, such as oligonucleotides (column 8, lines 5-15). Genzer further teaches that the resulting patterned substrates can be used as detection targets (i.e. for analysis comprising exposing the surface-chemical gradient to a molecule). (column 14, lines 54-65).

Therefore, one of ordinary skill in the art at the time of the invention would have been motivated to have patterned substrates with a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, such that a person of ordinary skill in the art would be able to conveniently measure different adsorption properties of complex molecular species simultaneously.

Genzer et al., however, teach that patterned substrates may be used as detection targets, and that one can produce a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, such that a complex biomolecules will choose an optimum combination of hydrophobic/cationic forces, and one can conveniently

measure the adsorption properties of complex molecular species (column 14, lines 54-65). Genzer et al. further teach that these gradients may be created using a silicon oxide covered wafers (column 15, lines 34-40) or PDMS substrates, which are hydrophobic substrates (column 5, lines 10-20), and coating the substrates with polyelectrolyte solutions, such as oligonucleotides (column 8, lines 5-15). Genzer further teaches that the resulting patterned substrates can be used as detection targets (i.e. for analysis comprising exposing the surface-chemical gradient to a molecule). (column 14, lines 54-65).

Therefore, one of ordinary skill in the art at the time of the invention would have been motivated to have patterned substrates with a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, such that a person of ordinary skill in the art would be able to conveniently measure different adsorption properties of complex molecular species simultaneously.

11. Claims 11, 13, 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morgenthaler et al. [Morgenthaler et al., Surfaces with a hydrophobicity gradient: possible applications in biological testing, 2001, European Cells and Materials, 6 (supplement 1): pp. 69] in view of Kochersperger et al [US 5,656,034].

Morgenthaler et al. teach a method of creating surfaces with a hydrophobicity gradients comprising immersion of substrates in a thiol solution and preparing wettability gradients on the substrate using a linear motion drive to control the immersion, wherein the adsorption kinetics can be controlled by the concentration of the solution, the solvent, and the immersion time (p.69, col.1). Morgenthaler et al. further teach that by varying the concentration of solutions, the sequence of the immersion, and the immersion speed of the substrate, wettability gradients of

different slopes can be generated (p. 69, col.1). Morgenthaler et al. further teach forming a wettability gradient on a substrate comprising single-component gradients (which would result in decreasing concentrations from a first area to a second area on the substrate) of methyl-terminated thiols (p.69, col.1). Morgenthaler et al. do not teach a second adsorbate increasing in concentration from the first area to the second area on the substrate.

Genzer et al., however, teach that patterned substrates may be used as detection targets, and that one can produce a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, such that a complex biomolecules will choose an optimum combination of hydrophobic/cationic forces, and one can conveniently measure the adsorption properties of complex molecular species (column 14, lines 54-65). Genzer et al. further teach that these gradients may be created using a silicon oxide covered wafers (column 15, lines 34-40) or PDMS substrates, which are hydrophobic substrates (column 5, lines 10-20), and coating the substrates with polyelectrolyte solutions, such as oligonucleotides (column 8, lines 5-15). Genzer further teaches that the resulting patterned substrates can be used as detection targets (i.e. for analysis comprising exposing the surface-chemical gradient to a molecule). (column 14, lines 54-65).

Kochersperger further teaches the step of using a syringe pump to deliver a solution, in order to provide a fluid dispensing means having an accurate volumetric fluid delivery (column 1, lines 42-48), which would result in a radially symmetrical gradient in an amount increasing from a first area on a substrate to a second area on a substrate.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Morgenthaler et al. with the step of using a syringe pump to

deliver a solution, as taught by Kochersperger, in order to provide a fluid dispensing means that has an accurate volumetric fluid delivery. The advantage of providing accurate volumetric amounts provides the motivation to combine the teachings of Morgenthaler et al. and Kochersperger. Furthermore, one of ordinary skill in the art at the time of the invention would have been motivated to have patterned substrates with a complex gradient that changes from hydrophobic to hydrophoilic in one direction and cationic to anionic in the other direction, and a second radially symmetrical gradient, such that a person of ordinary skill in the art would be able to conveniently measure different adsorption properties of complex molecular species simultaneously.

12. With respect to claim 17, Morgenthaler et al. teach forming a wettability gradient on a substrate comprising single-component gradients (which would result in decreasing concentrations from a first area to a second area on the substrate) of methyl-terminated thiols, followed by full immersion in a solution of hydroxyl-terminated thiols (p.69, col.1).

Response to Arguments

13. Applicant's arguments, see p. 13-14, filed October 21, 2009, with respect to the rejection(s) of claim(s) 1, 2, 4, 7, 10, 12-13 under 35 U.S.C. 102(b) as being anticipated by Natan et al. [US 6,242,264] have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as discussed above.

Conclusion

14. No claims are allowed.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson Yang whose telephone number is (571)272-0826. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Shibuya can be reached on (571)272-0806. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

16. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nelson Yang/
Primary Examiner, Art Unit 1641